
Space Weather Forecast

Issued on Sunday, 14 May 2023 at 13:16 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Chance of R1/R2 radio blackouts, decreasing slightly into new week.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been low over the last 24 hours, with occasional Common-class flares. These peaked with an impulsive flare at 14/0917UTC, originating from a complex sunspot just beyond the northwestern solar horizon. A satellite data outage continues. This outage started 13/0130UTC, and making sunspot analysis more difficult, and as a result observed sunspot trends are necessarily very general for the period. There are up to seven regions visible in available imagery, with the most complex group in the northwest presumed to remain in place just over the edge of the Sun's facing side by inference from recent Common-class X-ray activity. No new major CMEs were observed in the period.

Solar Wind / Geomagnetic Activity: The solar wind remained at slightly elevated levels, around 450 km/s. An unexpected solar wind magnetic field enhancement occurred later in the UTC day of 13 May. As part of this, the magnetic field associated with the solar wind changed from a very smooth and lowly Weak levels to linearly reach Moderate levels with a peak at 13/2000UTC, before returning to previous Weak levels. The north-south component was consistently co-aligned with Earth's field (to limit geomagnetic effects at that time), with the notable exception of the UTC evening, which saw a sharp descent and stronger anti-alignment before recovering. The number of particles in the solar wind was mostly within its typical background range, but peaking with the magnetic field enhancement in the early evening. The net result of the above solar wind measures was mostly quiet, with a provisional peak below Minor Geomagnetic Storm G1 in the strongest anti-aligned period in the 18-21UTC interval.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to remain at Low levels with a chance of returning to Moderate, with this risk greatest over the next 24 hours while the most complex spot group remains close to the western solar horizon, else declining into the new working week, with no major returning regions anticipated from available imagery.

Solar Wind / Geomagnetic Activity: Geomagnetic activity is most likely to remain at Quiet levels through this four-day guidance period. However there are complicating factors: firstly in the form of up to three CMEs, namely the 11 May southwest Moderate class flare CME; the 12/0500UTC southwest 'filament' CME; and the 13/0045UTC western solar horizon CMEs that all have some form of glance in a minority of MOSWOC Enlil ensemble members on 14 through 16 May, however misses are all considered more likely - to no effect. In addition to the above, there is a tenuous 'coronal hole' fast wind suggested in the MOSWOC Enlil model, although this is again not the preferred forecast, and should not cause significant activity.

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Energetic Particles / Solar Radiation: There is a daily slight chance of S1, decreasing through the period as the main sunspot responsible for this risk continue to recede westwards.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	1	10	10	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	30	20	20	20
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)